Anduril Roadrunner / Roadrunner-M

Reusable VTOL Counter-UAS Interceptor — Multi-Domain and Counter-UAS Volume

Quick Reference

Platform Designation: Roadrunner (baseline) / Roadrunner-M (kinetic interceptor variant)

Category: Reusable counter-UAS interceptor

Mission Class: Counter-UAS / point and area air defense

Manufacturer: Anduril Industries, Costa Mesa, California

Country of Origin: United States

Year Introduced: 2023 (public unveiling, December)

Propulsion: Twin small turbojet engines

Launch / Recovery: Vertical takeoff and landing from containerized launcher

Speed: High subsonic [VERIFY against latest Anduril public statements]

Range / Endurance: Tactical, optimized for intercept envelope [VERIFY — Anduril has not published full numbers]

Payload: Modular; Roadrunner-M carries kinetic warhead

Guidance: Lattice-integrated autonomous flight, human-on-the-loop engagement

Reusable: Yes — returns and recovers vertically when no engagement occurs

Operators: U.S. Special Operations Command (SOCOM); additional adoption in progress

BCI: [Computed below in The Four-Stack Read]

Assessment Date: April 2026

Identity and Designation

The Anduril Roadrunner is a reusable, vertical takeoff and landing unmanned aerial system manufactured by Anduril Industries, headquartered in Costa Mesa, California. The platform exists in two principal variants: Roadrunner, the baseline reusable platform, and Roadrunner-M, the kinetic counter-UAS interceptor variant equipped with an explosive payload. The platform is classified by Anduril as a high-performance, multi-mission, autonomous, vertical takeoff and landing air vehicle, and is functionally the first reusable jet-powered counter-drone interceptor in United States defense industry production.

The placement of Roadrunner in the Multi-Domain and Counter-UAS volume rather than the Air Domain volume is deliberate. While Roadrunner is an aerial platform by physical operation, its analytical role is that of a defender against other aerial platforms. Its data card answers different questions, computes its BCI against different cost-exchange ratios, and is compared against other counter-UAS systems rather than against the offensive aerial platforms it is designed to defeat.

Origin and Development

The Roadrunner was developed by Anduril Industries and publicly unveiled in December 2023. Anduril, founded in 2017 by Palmer Luckey and several co-founders, has become one of the most consequential new entrants in the United States defense industry, with a product line spanning unmanned aircraft, undersea systems, ground autonomy, and the Lattice command-and-control software platform that ties them together. The Roadrunner was developed specifically to address a gap in the counter-UAS market: the cost-exchange asymmetry created when defenders use single-use missile interceptors costing hundreds of thousands to millions of dollars to defeat drones costing a few thousand. The Roadrunner reverses that asymmetry by being reusable — if no engagement occurs, the platform returns and lands vertically, ready to fly again.

The reusable interceptor concept addresses one of the most-discussed problems in twenty-first century air defense, and the Roadrunner is the first operational answer to it from a major United States defense industry vendor. Several other companies have announced or demonstrated reusable interceptor concepts; Roadrunner is the platform that is in production and adopted by operational customers.

Physical Characteristics

The Roadrunner airframe is a twin-turbojet, vertical takeoff and landing aircraft with a distinctive boxy fuselage designed for modular payload integration and ease of manufacturing.

The platform launches from and recovers to a containerized launch and recovery system, with no requirement for a runway, prepared launch pad, or external launch infrastructure. Multiple Roadrunners can be loaded into a single transportable container for rapid expeditionary deployment.

Specific dimensions and mass have not been published in detail by Anduril. Public reporting describes the platform as in a class above traditional small drones but smaller than crewed light aircraft. The vertical recovery requirement places mechanical demands on the airframe that drive specific design choices, including landing leg structure, thrust-vectoring authority for hover stabilization, and protection of the payload bay during landing.

Propulsion and Power

Propulsion is provided by twin small turbojet engines, giving the Roadrunner subsonic high-speed flight performance and a thrust-to-weight ratio sufficient for vertical takeoff and recovery. The use of jet propulsion — rather than electric or piston — places the Roadrunner in a performance class above almost any drone in its weight category, and is what makes the platform capable of intercepting high-speed targets including jet-powered cruise missiles and other high-end threats.

The vertical takeoff and recovery capability eliminates the runway dependency that has historically limited the operational flexibility of

jet-powered unmanned systems. The combination of jet propulsion with VTOL recovery is a deliberate engineering bet: the program traded mechanical complexity at the launch and recovery interface for operational flexibility in the field. The bet appears to have been validated by operational adoption, although the long-term test of the platform will be in the rate at which it can actually be reused under real combat conditions, not in demonstration scenarios.

Guidance, Navigation, and Control

The Roadrunner is operated through Anduril's Lattice command-and-control software platform, which provides sensor fusion across the operational environment, target identification and prioritization, and human-on-the-loop authorization for engagement. The platform is autonomous in the sense that it executes intercept profiles without continuous operator input, but engagement decisions remain under human control.

The combination of autonomous platform execution with human engagement authorization is the operational model Anduril has positioned as the responsible approach to autonomous lethal systems — sufficient autonomy to operate at machine speed against fast-moving targets, with the engagement decision retained by a qualified human operator. This is the same operational model now being adopted across multiple counter-UAS programs and represents the current consensus position in the US defense

community on the appropriate human role in autonomous engagement.

Sensors and Payload

The Roadrunner-M variant carries a kinetic warhead optimized for the counter-UAS mission, with payload mass and warhead configuration tailored to the intercept requirement rather than to traditional air-to-ground or air-to-air weapon profiles. The baseline Roadrunner platform is configured for non-kinetic missions including surveillance, electronic warfare, and other modular payloads. Anduril has stated that the airframe is designed to support a family of mission payloads, with the M variant representing one specific mission configuration rather than the limit of the platform’s capability.

Onboard sensors for terminal engagement geometry have not been described in public detail. Lattice integration provides the platform with sensor fusion data from external sources, including ground-based radar, electro-optical and infrared tracking systems, and other sensors operating in the same battlespace. The Roadrunner does not have to find its own targets; it inherits target track data from the Lattice ecosystem and prosecutes the intercept.

Mission Profile

The Roadrunner is built to address the cost-exchange problem that defines twenty-first century counter-drone defense. Traditional surface-to-air missiles cost between three

hundred thousand and several million dollars per shot. The drones they are used to defeat — Shahed-class one-way attack systems, Group 1 and 2 commercial-derived attack drones, and other low-cost threats — cost between five hundred and fifty thousand dollars. Every successful intercept by a traditional missile is a financial loss for the defender.

The Roadrunner inverts that math by returning unused, allowing the defender to commit the platform to an engagement opportunity without committing the platform's full unit cost. If the threat track resolves into a non-target or the engagement is called off, the Roadrunner recovers and is ready for the next engagement. The cost-exchange ratio of a reusable interceptor against a one-way attack drone is fundamentally different from the ratio of a single-use missile against the same target, and that difference is the entire reason the platform exists.

Mission categories include point defense of fixed installations, area defense over operational maneuver units, counter-cruise-missile defense in coordination with ground-based air defense networks, and protection of high-value mobile assets. The exact mission allocation in operational service is not publicly disclosed.

Operators and Service History

The Roadrunner has been adopted by U.S. Special Operations Command and is in production at Anduril's manufacturing facilities. Specific deployment locations and operational

employment details remain limited in public reporting. The platform has been the subject of significant interest from allied militaries facing similar counter-UAS challenges, and the program has expanded in scope since its initial 2023 unveiling. [VERIFY] tags apply to specific operator counts and deployment status as the program continues to mature.

Engineer’s Read

The Roadrunner represents a deliberate engineering bet that the future of counter-drone defense lies in reusable interceptors rather than improved single-use missiles. That bet is supported by basic economics — every engagement cycle that returns the interceptor to inventory is a win for the defender — and by the operational reality that the threat density of small drones is rising faster than missile production rates can absorb.

The decision to commit to twin turbojet propulsion with vertical recovery is not a small engineering choice. It commits the program to a mechanical complexity and a flight control challenge that simpler architectures avoid. Vertical recovery of a jet-powered aircraft is one of the more demanding control problems in modern aerospace engineering, and the fact that Anduril has solved it in production indicates that the company’s autonomy stack has matured to a point where this kind of problem is now within reach. The platform also depends critically on the Lattice software ecosystem; outside of Lattice

integration, the Roadrunner would not be the same platform.

The long-term test of the platform will be in the rate at which it can actually be reused under real combat conditions, not in demonstration scenarios. The reusability claim is the entire economic argument for the platform; if the operational reuse rate falls below expectations — due to maintenance burden, recovery damage, or any other factor — the cost-exchange math changes substantially. Programs of this kind are evaluated honestly only after sustained operational employment, and that evaluation remains ahead of the public record.

The Four-Stack Read

Propulsion: Twin turbojet engines with vertical takeoff and recovery. Performance class previously reserved for missile-grade systems, delivered on a reusable platform. The mechanical complexity of the recovery interface is real but operationally validated.

Guidance: Lattice-integrated autonomous flight with human-on-the-loop engagement authorization. Three-stack guidance architecture combining inertial sensors, external sensor fusion through Lattice, and terminal engagement geometry. The platform inherits target tracks from the broader Lattice ecosystem rather than acquiring targets independently.

Sensors: Mission-modular payload architecture supporting kinetic warheads, electronic warfare, and other configurations. The platform is a

delivery system; the payload defines the mission. Roadrunner-M carries the kinetic counter-UAS warhead. Other variants address other mission requirements.

Autonomy: Autonomous platform execution with human engagement authorization. Functionally Level 4 autonomy with deliberate human override on the kill chain — a configuration that addresses both the operational tempo requirement and the rules-of-engagement requirement simultaneously. This is the responsible-autonomy operational model that has become the United States defense community consensus.

Integrated read: The Roadrunner is the platform that demonstrates the counter-UAS conversation has matured past the question of whether reusable interceptors can work. They can. The remaining questions are about scale, cost per engagement cycle, and how Lattice integration changes the role of the operator in fast-moving counter-drone defense. Roadrunner is the answer to the cost-exchange problem the rest of the industry has been describing for five years. It is the first answer that is actually fielded.

Battle Complexity Index (BCI)

The BCI for a counter-UAS platform is computed inversely to the BCI for an offensive platform. Where the offensive BCI asks whether the attacker is winning the cost-exchange war, the

counter-UAS BCI asks whether the defender is winning it.

Kill probability (Pk): 7 — platform is a high-performance interceptor with mature guidance integration through Lattice; demonstrated capability against representative threats; operational record continues to develop

Guidance coverage: 8 — Lattice ecosystem provides robust sensor fusion and target track inheritance; engagement envelope covered across multiple sensor modalities

Normalized range: 7 — tactical engagement envelope appropriate to the counter-UAS mission; not a long-range strategic interceptor and not intended to be

Magazine factor: 6 — reusable platform extends effective magazine depth substantially over single-use interceptors; production rate is mature but still scaling against threat density

Cost-exchange ratio: 8 — reusable platform fundamentally changes the cost-exchange math against low-cost drone threats; favorable to the defender across the threat profile this platform is built for

BCI = (7 + 8 + 7 + 6 + 2 × 8) / 6 = (7 + 8 + 7 + 6 + 16) / 6 = 44 / 6 = 7.3

A BCI of 7.3 places Roadrunner in the upper band of the counter-UAS scale, reflecting a platform that is genuinely shifting cost-exchange economics in the defender’s favor for the threat class it is designed to defeat. The score is sensitive to operational reusability rates and production scale, both of which remain in

development. A re-assessment is warranted as the program matures and additional operational data becomes available.

Cross-References

Volume 1, Chapter 4: cost-exchange asymmetry and the defender’s dilemma. The Roadrunner is a direct response to both.

Volume 1, Chapter 11: The Redundancy Rule applied to guidance stacks. The Roadrunner inherits guidance from the Lattice ecosystem, which extends the redundancy principle from on-platform sensors to multi-platform sensor fusion.

Volume 1, Chapter 13: The Autonomy Stack as Single Point of Failure. The Lattice dependency is itself a single point of failure for the Roadrunner. A defender employing this platform should understand that the platform inherits both the strengths and the failure modes of the Lattice software ecosystem.

Volume 2, Counter-UAS Volume: companion data cards include AeroVironment LOCUST (high-energy laser counter-drone weapon), Coyote interceptor family, and the Smart Net Round concept.

Volume 2, Air Domain: the threat platforms this system is designed to defeat — Shahed-136, Lancet-3 family, FPV strike drones, and others — are documented there. The Counter-UAS volume entries are best read in conjunction with the Air Domain entries they address.

Card Status

Version: v1

Assessment Date: April 2026

Next Review: Recommended after 12 months of additional operational data, or upon major program update

Verification Notes: [VERIFY] tags apply to specific dimensional, performance, and operator-count fields where Anduril has not published detailed public specifications. The card has been written to remain accurate even as those specifics emerge.